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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,774	07/07/2005	Pierre Barberis	1298/10025	1671
23280	7590	07/07/2009	EXAMINER	
Davidson, Davidson & Kappel, LLC 485 7th Avenue 14th Floor New York, NY 10018			SHEVIN, MARK L	
			ART UNIT	PAPER NUMBER
			1793	
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			07/07/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/541,774	BARBERIS ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	MARK L. SHEVIN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 27 April 2009.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 11-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 11-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ .  | 6) <input type="checkbox"/> Other: _____ .                        |

## DETAILED ACTION

### ***Status of Claims***

1. Claims 11-20, filed April 27<sup>th</sup>, 2009, are currently under examination. Claims 1-10 are cancelled and claim 18 was amended.

### ***Status of Previous Objections***

2. The previous objection to claim 18 under 37 CFR 1.75(c) has been withdrawn in view of the amendment to this claim.

### ***Status of Previous Rejections***

3. The previous rejections of claims 11-20 under 35 U.S.C. 112, 1st paragraph (written description - new matter) in the Office action dated January 23<sup>rd</sup>, 2009 have been withdrawn after further review of the instant specification, particularly p. 8, final para, which implicitly states that cooling steps may be omitted after the first forging step.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 103***

4. Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sabol** (EP 0.085.553) in view of **Van Swam** (US 5,835,550).

### **Sabol**

Sabol, in his background section, teaches that nuclear grade Zircaloy (Zr-Sn) alloy products are made by producing an ingot (ingots are, by definition, cast [Oxford English Dictionary: "A mass of cast metal..."]) having a diameter between 16 and 25

inches, which corresponds to approximately 406 and 635 mm respectively. The ingot is then heated into the beta, *alpha+beta*, or high temperature alpha phase and then worked to some intermediate sized and shaped billet (page 2, lines 4-19). This primary ingot breakdown may be performed by forging, rolling, extruding, or combinations of these methods (p. 2, lines 11-16).

Sabol further teaches that depending on the size and shape of the intermediate product (after first forging step), the billet may be alpha worked and then forged to a size and shape appropriate for extrusion (page 2, lines 25-29).

Sabol's semi-finished products may be tubes intended to be sent to a tube mill for final processing (p. 3, lines 1-7).

Overall, Sabol teaches that after a first step of producing an ingot, and then forging this ingot to produce a semi-finished product (intermediate billet, page 2, line 14). Sabol envisages the option of having a single forging step (page 2, lines 12-19; page 4, lines 6-13). However, Sabol does not teach the specific claim limitations involving the length of the ingot, however one of ordinary skill could attain the claimed size limitations through routine optimization. Furthermore, there are repeated references to later operations as being adjustable or tailored to the size and shape of the ingot billet (page 2, lines 29-35).

Sabol does not specifically teach a two-stage forging process without an intermediate beta quenching or the number of steps or stages entailed by the process of "primary ingot breakdown."

**Van Swam**

Van Swam, drawn to a process for fabricating a nuclear fuel rod cladding tube (Abstract), discloses a family of zirconium alloys (claim 1) for use in his inventive processing method consisting essentially of 0.3 - 1.8 wt% Sn, 0.1-0.65 wt% Fe, and the balance Zr where the ingot is heated to a temperature in the beta range and then completed in the alpha+beta or alpha range in one or a multiple of steps (col. 8, lines 54-67). The family of Zr alloys may also contain up to 0.015 wt% Si, 0.005-0.02 wt% C, and 0.09-0.22 wt% O (col. 8, lines 39-53).

The cast ingots of Zr alloy are made into structural parts for reactor service or into hollow tubes for fuel rod cladding (col. 8, lines 59-61).

Regarding claims 11, 16, and 17, it would have been obvious to one of ordinary skill in zirconium ingot processing, at the time of the invention, to cast a Zr alloy of at least 97 wt% Zr with a diameter of 400-700 mm and a length of 2-3 m, forge it in two stages where the first stage is performed at an alpha+beta temperature and the second at an alpha+beta or alpha temperature without an intermediate quenching step, followed by extrusion or hot rolling as Sabol taught that nuclear grade Zircaloy (Zr-Sn) alloy products are made by producing an ingot (ingots are, by definition, cast [Oxford English Dictionary: "A mass of cast metal...]) having a diameter between 16 and 25 inches, which corresponds to approximately 406 and 635 mm respectively. The ingot is then heated into the beta, *alpha+beta*, or high temperature alpha phase and then worked to some intermediate sized and shaped billet (page 2, lines 4-19). This primary ingot breakdown may be performed by forging, rolling, extruding, or combinations of these

methods (p. 2, lines 11-16). Sabol further teaches that depending on the size and shape of the intermediate product (after first forging step), the billet may be alpha worked and then forged to a size and shape appropriate for extrusion (page 2, lines 25-29). However, Sabol does not teach the specific claim limitations involving the length of the ingot, however one of ordinary skill could attain the claimed size limitations through routine optimization. Furthermore, there are repeated references to later operations as being adjustable or tailored to the size and shape of the ingot billet (page 2, lines 29-35). One would then be motivated to look to Van Swam to determine the number of steps or stage in the primary ingot breakdown process of Sabol as Van Swam is drawn to a similar Zr-base alloy for nuclear structural components such as tubing, features alpha+beta forging with later extrusion and rolling, and teaches that nuclear fuel tubular cladding can be made by one or more forging steps in the alpha+beta or alpha range.

Regarding claims 12-15, the amount of alpha phase present in the billet during forging can be easily optimized through routine optimization and by consulting a phase diagram that is well known to metallurgists. The temperature range at which a given zirconium alloy will contain both the alpha and beta phase will vary depending on the alloy composition, and the temperature range can be selected by routine optimization depending on the alloy used.

Regarding claim 18, Van Swam, drawn to a process for fabricating a nuclear fuel rod cladding tube (Abstract), discloses a family of zirconium alloys (claim 1) for use in his inventive processing method consisting essentially of 0.3 - 1.8 wt% Sn, 0.1-0.65

wt% Fe, and the balance Zr and Sabol's disclosures at p. 2-3 references Zircaloy-2 and Zircaloy-4 alloys, both of which satisfy the requirements of claim 18 in terms of total additive elements (see Sabol: p. 1, para 2, lines 8-19 for the Zircaloy compositions).

Regarding claims 19-20, further specifying intended use does not patentably distinguish these claims over the teachings of Sabol. Sabol teaches that Zircaloy materials may be used as tubular cladding for fuel pellets (p. 2, lines 20-21) and it is clear that these materials are used in nuclear reactors. Furthermore, Van Swam taught that the alloys and processing method of his invention were used to make structural parts for reactor service or hollow tubes for fuel rod cladding (col. 8, lines 59-61). One of ordinary skill would also be motivated to produce a bar per instant claim 20 for the same reasons as manufacturing a tubular product.

***Response to Applicant's Arguments:***

5. Applicant's arguments filed April 27<sup>th</sup>, 2009 have been fully considered but they are not persuasive.

Applicants' remarks (p. 4, para 3 to p. 5, para 2) with respect to the claim objections and 35 U.S.C. 112 rejections are moot in view of the withdrawn of these rejections in the instant Office Action.

Applicants assert (p. 6, para 2) that Sabol beta quenches after the initial forging and that Van Swam fails to meet the beta quenching limitation as well.

In response, Sabol does teach a single forging process of primary ingot breakdown which involves heating to the beta, alpha+beta, or high temperature alpha

Art Unit: 1793

phase and then working to some intermediate sized and shaped billet (p. 2, lines 4-19) and does not require beta quenching. The primary ingot breakdown step may be performed by forging, rolling, extruding, or combinations of these methods (p. 2, lines 11-16). Combinations of these methods is interpreted to mean one or multiple forging steps in view of Van Swam, which is directed to processing substantially similar Zr alloy for nuclear reactor service, as in Sabol.

Applicants assert (p. 7, para 2) that Van Swam dissuades one of ordinary skill in the art from performing forging in the alpha+beta phase, thus there is no motivation to modify Sabol to include the teachings of Van Swam.

In response, Van Swam explicitly teaches that the forging is completed in the alpha+beta range or the alpha range in one or a multiple of steps as disclosed in Col. 8, lines 54-67 and beta quenching is only mentioned as being performed after forging and before rolling or extrusion (col. 8, line 67 to col. 9, line 11).

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1793

**-- Claims 11-20 are finally rejected**

**-- No claims are allowed**

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

*/Mark L. Shevin/  
Examiner, Art Unit 1793*

July 2nd, 2009  
10-541,774

*/George Wyszomierski/  
Primary Examiner  
Art Unit 1793*